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Proposals for enhancing tactical planning in grocery retailing with S&OP

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Abstract

Purpose – This paper explores tactical planning in grocery retailing and proposes how process and integration mechanisms from sales and operations planning (S&OP) can enhance retail tactical planning.

Design/methodology/approach – This work follows an explorative design with case studies from the grocery retailing industry in Finland, Norway, and the UK.

Findings – The tactical planning process focuses on demand management and securing product availability from suppliers in order to reach sales targets. Less attention is directed towards balancing supply and demand or towards providing a single plan to guide company operations. Planning appeared to be functionally oriented with limited coordination between functional plans, but it did include external integration that improved forecast accuracy.

Research limitations/implications – The study involves grocery retailer cases with variable level of S&OP maturity. The propositions need to be investigated further through action research or additional case studies to confirm their validity.

Practical implications – The study proposes a design of an S&OP process in retailing and propositions for improving tactical planning integration.

Originality/value – The study complements research on retail tactical planning by taking planning process and integration viewpoints. The research suggests that retailers would benefit from a formal and company-wide S&OP process to unify different market-oriented plans to a single set of numbers, thus better balancing supply and demand without sacrificing the emphasis on demand planning.

Keywords Retail planning, Grocery, Sales and operations planning, Tactical planning process, Planning integration.

Paper type Research paper

Introduction

Grocery retailers serve a competitive market with well-informed consumers expecting excellent product availability, rich assortment, fresh products, and low prices (Hübner *et al.*, 2013; Kuhn and Sternbeck, 2013). The ability to meet such demands is challenged by environmental features, such as a long growth/production lead time, supply seasonality and uncertainty (Taylor and Fearn, 2009; van Donselaar *et al.*, 2010; Ettouzani *et al.*, 2012; Alftan *et al.*, 2015; Ivert *et al.*, 2015), short product shelf life (Ketzenberg *et al.*, 2015), demand variability, and large frequently

changing product assortments (Hübner *et al.*, 2013; Ketzenberg *et al.*, 2015). To cope with these challenges, retailers have required short lead times from suppliers. Despite such requirements, the retailers face risks connected to reduced availability, frequent markdowns, and waste (Småros, 2007; Hübner *et al.*, 2013; Alftan *et al.*, 2015), factors that may greatly impact their profitability. Therefore, efficient supply and demand planning is essential for coordinating the numerous individual and time-restricted decisions that exist in the supply chain (Hübner *et al.*, 2013). In particular, proper tactical planning may provide stability in this regard, as it sets the premise for further operational decisions.

In retailing, tactical planning determines the ground rules for regular operations during the coming 6-12 months; it requires adaptation to seasonal demand patterns as well as yearly business plans when negotiating with suppliers (Hübner *et al.*, 2013). Implicitly, tactical planning in retailing has been present in several concepts focusing on collaborative demand and supply management, including efficient consumer response (ECR), quick response (QR), vendor managed inventory (VMI), and collaborative planning, forecasting, and replenishment (CPFR) (Holmström *et al.*, 2002; Aastrup *et al.*, 2008). Only recently has tactical planning in retail been identified and analyzed explicitly (Hübner *et al.*, 2013, Kuhn and Sternbeck, 2013). These works focus on the types of decisions made while partially studying their interrelations; however, they do not consider the planning process and integration. In general, demand-driven category management and supply-oriented operations management seem to be planned separately in retail organizations (Kuhn and Sternbeck, 2013).

In manufacturing industries, tactical planning have been well established and clearly distinguished from operational and strategic planning (Fleischmann *et al.*, 2008). In particular, sales and operations planning (S&OP) is a well-formulated planning process aiming to maximize a company's profitability by balancing customer demand with supply (Tuomikangas and Kaipia, 2014; Wagner *et al.*, 2014). In S&OP, integration is enhanced through a set of mechanisms aligning business strategy and operational planning while supporting the involved business functions and supply chain partners (Affonso *et al.*, 2008). A growing body of literature has studied S&OP in the manufacturing context, but this topic remains scantily covered in the retail sector (Harwell, 2006; Oliva and Watson, 2011; Kuhn and Sternbeck, 2013) despite the call for additional studies focusing on different industries (Thomé *et al.*, 2014; Kristensen and Jonsson, 2018).

Therefore, the current paper aims to explore tactical planning processes and planning integration in grocery retailing while making propositions regarding how process and integration mechanisms from S&OP can enhance retail tactical planning. The study contributes to the S&OP literature by providing contextualized empirical insights into tactical planning for grocery retailers while suggesting directions for adjustment to the established S&OP process. In relation to the grocery retailing literature, the study proposes process and integration elements that can improve the formalization of tactical planning. Managerially, the study provides proposals for adopting S&OP in the grocery retailing context.

The remainder of this paper begins with a discussion of theoretical framework before elaborating on the research methodology. We then analyze the tactical planning processes in cases from grocery retailing before moving on to a cross case analysis. We conclude by discussing our findings in relation to the previous literature while proposing recommendations for retailers and future research.

Theoretical framework

The main elements of supply chain planning are the processes and levels of integration applied to manage operations and relationships (Jonsson and Holmström, 2016), and these constructs form the basis of our theoretical framework. Based on the S&OP literature, we developed a framework for analyzing the tactical retail planning process and integration and the contextual dimensions of grocery retailing. Finally, we present previous studies on tactical planning in grocery retailing from the viewpoints of process and integration.

S&OP as a process

S&OP is a continuous and interactive process typically organized around five main *activities* (Wagner *et al.*, 2014). It starts with *updating data* regarding past performance (such as the past month's sales and production quantities) and *disseminating data* relevant for the development of new forecasts. The next two activities analyzing actual vs. planned performance are *demand* and *supply planning* and *developing new unconstrained demand and supply plans*. During the fourth activity, *pre-meeting*, representatives of different functions on both the demand and supply sides meet to discuss and adjust demand and supply plans within the frame of policies, strategies, and business plans. In the final activity, pre-meeting decisions either are approved or further discussed before being decided upon in an S&OP *executive meeting*. This basic S&OP process has developed to include other supply chain stages and partners (Affonso *et al.*, 2008; Wang *et al.*, 2012). In cases of highly variable supply, as in the food and drink industry, Yurt *et al.* (2010) propose that the S&OP process should be adapted with an initial supply planning, consisting of supply prediction conducted by the purchasing function. This plan is passed on to the sales and marketing function for the demand planning step ("Insert Figure 1). Similarly, Ivert *et al.* (2015) have found that industrial food producers adjust their S&OP processes by adopting specific activities related to supply planning (forecasting of raw material quantity and quality, and/or what-if scenarios in supply planning).

"Insert Figure 1 about here".

The *setup parameters* of the planning process refer to the planning horizon, frequency, and object (Jonsson and Mattsson, 2009). In a food producer context, the S&OP *planning horizon* is between one and two years and depends on the supply seasonality, contracts with sub-contractors, and customers (Ivert *et al.*, 2015). Additionally, some food producers differentiate the planning horizon by decisions (Ivert *et al.*, 2015). The most common *planning frequency* is monthly (Lapide, 2005; Grimson and Pyke, 2007; Ivert *et al.*, 2015) though food producers have more frequent planning due to the industry's promotion-intensive nature (Yurt *et al.*, 2010; Ivert *et al.*, 2015). Generally, the *planning object* in S&OP is the product family (Jonsson and Mattsson, 2009), but in a food producer context, a stock keeping unit (SKU) level may be warranted because of the great variety of products and large number of product launches (Ivert *et al.*, 2015).

The *inputs* of the S&OP process consist of plans and forecasts as well as information on customers, suppliers, resources, capacities, inventories, and S&OP goals (Thomé *et al.*, 2014). The literature emphasizes demand, sales, and production plans, but in advanced forms, S&OP deals with procurement, supply, distribution, and financing. Ivert *et al.* (2015) find that material supply uncertainty and its forecasts are important inputs in the food producers' context. A main *outcome* of the S&OP process is partial or comprehensive integration, both horizontal alignment of different functional plans and vertical alignment of the strategic and operational plans (Thomé *et al.*, 2012; Wagner *et al.*, 2014). Some companies focus on the integration of sales and demand forecasts while others concentrate on procurement and supply planning. Table I summarizes the S&OP process variables identified in the literature.

“Insert Table I about here”.

S&OP mechanisms enhancing plan integration

Integration refers to the special building blocks that cause firms (or functions) to collaborate in the long term (Morash and Clinton, 1998; Chen *et al.*, 2007; Vieira *et al.*, 2009). In the S&OP literature, integration has been operationalized as the types and degrees of collaboration and participation between different functions (Tuomikangas and Kaipia, 2014), the degree of resource sharing, the collaborative process operations, and the improvements made (Nakano, 2009). As Table II illustrates, this study relies on the mechanisms proposed by Grimson and Pyke (2007) because their research explicitly explores and identifies a relationship between each of the mechanisms and plan integration.

“Insert Table II about here”.

The first three mechanisms appear to be more important for plan integration. The information technology (IT) mechanism seems to gain importance when aiming to achieve higher levels of S&OP maturity and plan integration (Grimson and Pyke, 2007). For example, when external collaboration comes into play, trading partners need to share data on planned product promotions, new product introductions, and feedback (Goh and Eldridge, 2015).

Characteristics of grocery retailing that affect planning

Previous research has identified aspects of the planning environment that affect planning process design (Jonsson and Mattsson, 2003; Olhager and Selldin, 2007; Kaipia and Holmström, 2007; Fredriksson *et al.*, 2014; Kristensen and Jonsson, 2018). Ivert *et al.* (2015) have noted that the process and setup are affected by planning environment characteristics related to product, demand, and supply. These characteristics are elaborated for the retail environment and summarized in Table III.

Product-related characteristics. There is a large and increasing assortment of grocery products (Kaipia and Tanskanen, 2003; Agrawal and Smith, 2009), including up to 50,000 items (Hübner, 2011). Products typically have a limited and short shelf-life, and their demand may be interrelated with other products (Agrawal and Smith, 2009). Meanwhile, product life cycles are shortening while the change-rate is accelerating (Kaipia and Tanskanen, 2003). Hübner (2011) found that products belonging to the permanent assortment have a stable life cycle compared to other industries. The products are heterogeneous even though they are highly standardized (Hübner, 2011).

Demand-related characteristics. Retail is organized around multiple marketing channels, such as supermarkets, discounters, food services, and online retailing, all of which target different customer segments, increasing retail complexity (Agrawal and Smith, 2009; Dani, 2015). Demand fluctuations and uncertainty also are affected by different market events, such as seasonality, promotional activities, and product interrelation (Hübner, 2011). The assortment has stable prices compared to other industries, but during promotions, products have varying prices (Hübner, 2011). High availability requirements are propelled by fierce competition, with a consequent risk of losing sales because consumers have to be served immediately. Grocery retailers must proactively manage supply and demand requirements (e.g. by varying offers and prices) (Hübner, 2011). As a result, forecasting and sales planning hold higher importance than in other industries (Hübner, 2011).

Supply-related characteristics. Retailers source products from many suppliers (Hübner, 2011) while using multiple brands and suppliers for the same product type (Agrawal and Smith, 2009). The replenishment cycle needs to be short and reliable because of the product shelf life and high service level requirements (Hübner, 2011). This characteristic contrasts with the long lead times and seasonality of several food raw materials, as well as their sensitivity to weather and other environmental conditions. Additionally, different grocery products have dedicated distribution requirements, such as cooled, ambient, or frozen (Agrawal and Smith, 2009; Hübner, 2011).

“Insert Table III about here”.

Tactical planning in retailing

The main grocery retail management initiatives, such as ECR, have attempted to integrate retailers and manufacturers/suppliers in order to fulfill consumer needs better, faster, and at less cost (Aastrup *et al.*, 2008). They incorporate logistic-driven strategies and processes constituting efficient replenishment, such as cross-docking and continuous replenishment. Also, demand- and marketing-driven collaborative processes have been developed for category management, such as efficient store assortment, promotion, and product introduction (Corsten, 2000). The CPFR concept emerged to bridge the gap between demand and supply side planning (Holmström *et al.*, 2002). Researchers claim that the process is demand driven and uni-directional, proceeding from the sales to the logistics forecast (Holmström *et al.*, 2002). Further developments in this process, such as collaborative buyer-managed forecasting (Alftan *et al.*, 2015), focus more on how to improve forecasting in order to better handle exceptional demand situations when replenishing.

The literature on tactical retail planning typically focuses on the planning aspects of specific parts of the supply chain, such as delivery patterns (Kuhn and Sternbeck, 2013), in-store operations (Kotzab and Teller, 2005; van Donselaar *et al.*, 2010; Reiner *et al.*, 2013), retail store replenishments (van Donselaar *et al.*, 2010; Alftan *et al.*, 2015), or waste reduction in fresh food supply chains (Kaipia *et al.*, 2013). Hübner *et al.* (2013) provide an important contribution to grocery retail planning research with a demand and supply chain grocery retail planning framework synthesizing the most common planning problems. At the tactical level, the planning is divided into two levels of aggregation for decisions. The upper level deals with *master category planning* covering sales aspects, and *product segmentation and allocation* managing issues related to procurement, warehousing, and distribution. The lower level considers *plans for managing the product flow* (inbound-, production-, and distribution-, and in-store planning). These decisions are made for different planning objects, including both product-specific and product-segment specific choices. The framework does not reflect a planning process or interrelationship towards a common goal between the sales-oriented and operations-oriented functions; there is a clear division between planning activities.

A case study in a complex retailing environment, the home furniture retail, presents a process-oriented viewpoint of tactical planning, and studies process and integration aspects of planning (Agrawal and Smith, 2009). According this study, master category planning is an essential activity of the retail tactical planning that usually initiates the process. Such planning is done in collaboration with the sales, sourcing, and inventory teams, but in a sequential manner. This study illustrates by two cases the complexity of retailers supply chain decisions in practice and the challenges in managing the decisions done by different functions, and managing products with different supply lead times and life-cycles. In particular, the study highlights the urgent need of retailers for advanced and contextualized methodologies to improve retail decision making.

To summarize, there have been successful attempts to increase collaborative planning in retailing and to enhance forecasting and information sharing in planning. Even though ECR, for example, has brought suppliers and retailers into the same process, there is still a need for a more balanced view of grocery retailers' tactical supply and demand planning.

Research design

We follow a case study approach in order to serve the purpose of this paper: to explore tactical planning and to propose how process and integration mechanisms from S&OP can enhance the tactical planning of grocery retailing. Case study research is particularly helpful when exploring new and complex real-life events (Yin, 2009), when the context and experience are critical for understanding the phenomenon of interest (Barratt *et al.*, 2011), and when the research builds on existing theoretical frameworks (Voss *et al.*, 2002).

The unit of analysis is the tactical level of planning in grocery retailing, particularly the process and planning integration. We aim to investigate the theory and the retail context by iterating between the theory and the empirical data—an approach that can be characterized as theory elaboration (Ketokivi and Choi, 2014; Narasimhan, 2014). Theory elaboration focuses on contextualizing the logic from a general theory. In other words, it necessitates reconciliation of the general (in our situation S&OP) with the particular (the context of grocery retailing derived from case studies) (Ketokivi and Choi, 2014).

Case companies

The research involved cases in the grocery retail sector in Finland, Norway, and the UK (Table IV). Case studies are not meant to generalize findings, but merely to empirically provide insights while elaborating on a theoretical concept (Yin, 2009). We selected cases based on a few considerations. First, based upon our preliminary familiarity with several grocery retailers, we sought to include planning practices and capabilities at different levels to broaden the empirical foundation for analysis and subsequent propositions. Using multiple cases reduces the risk of misjudging the generalizability of single events (Voss *et al.*, 2002). Second, we selected cases with a large responsibility for the logistical network and broad product range. Third, we chose cases located in geographical areas with comparable characteristics in terms of the industry structure and retailing business model, making the cases suitable for a cross-case analysis.

“Insert Table IV about here”.

Data collection

As shown in Table V, our primary data sources were interviews with key informants and information from workshops. We also used additional information, such as process and activity descriptions, calendar data, organization charts, presentations, and reports.

“Insert Table V about here”.

For each case, we organized workshops before the interviews to become acquainted with the company and its operating principles and to ascertain the big picture of the planning. We further developed a case study protocol (Yin, 2009) to support the theory-elaboration nature of the research (Barratt *et al.*, 2011; Ketokivi and Choi, 2014). An interview guide was designed to explore tactical planning in grocery retail based on S&OP process variables and integration mechanisms (Tables I, II, and III). Retail related planning literature, such as Hübner *et al.* (2013) and Agrawal and Smith (2009) was used to gain understanding of the grocery retail context as well as its tactical planning. However, it could not be used as a basis for analytical framework

since it didn't offer process and integration specific concepts in a generic manner, as the S&OP literature does.

Two researchers were present during each interview, recording and taking notes. Directly after the visit, the researchers documented the interviews in field notes that were sent to the companies for approval and verification (Yin, 2009).

Case analysis

As suggested in the case study literature (Yin, 2009), we began with a within-case analysis followed by a cross-case analysis (Barratt *et al.*, 2011). We used the frameworks in Tables I, II and III to identify and classify the collected data, thus structuring the data analysis while permitting simultaneous investigation of the theory and the context (Eisenhardt, 1989). The within-case analysis resulted with process maps that included the activities, setup, and main inputs of the planning process (Table I). We also identified the use of integration mechanisms (Table II) and grocery retail characteristics (Table III) in the collected data, structuring them around the process map. This procedure helped to ensure confirmability between the theoretical constructs and the case data (Kaufmann and Denk, 2011).

The analyses provided insights into the retail context and existence of S&OP process elements and integration mechanisms. We analyzed the contextual factors of each case and their effects on tactical planning. By reflecting on the case findings and the S&OP literature, we extracted six propositions for enhancing tactical planning in grocery retailing related to the most critical dimensions identified, in essence where there existed the largest deviations from the S&OP prescribed process and integration.

Research quality

In general, to secure rigor, we followed the research procedures defined by Stuart *et al.* (2002) for analyzing qualitative data. All cases involved multiple respondents, providing multiple sources of evidence. After interviews, we also sought respondents' approval of our field notes, which contributed to the construct validity of the phenomena under investigation while allowing us to clarify any doubts about the collected data (Yin, 2009). Internal validity was secured by defining the retail context, the concepts, and their indicators and by using them in the interview guide. External validity was achieved by including four cases reflecting tactical planning practices. The field notes later were distributed to all authors, along with the interview guide and background material, to ensure that all researchers had the same understanding of the basic concepts, terminology, cases, and issues relevant to the study. Together with the case study protocol, this database of literature and field notes increases the study's reliability and facilitates potential replication (Yin, 2009).

Within-case analysis

While considering the unique retail context, we analyzed the cases' current tactical planning processes and the mechanisms for plan integration from the perspective of S&OP process and integration frameworks (Tables I and II).

Case 1: full range retailer

Planning process: Tactical planning is conducted in two generic time frequencies: a yearly category, supply, and capacity planning, and a periodical planning of promotions, seasons, and new product introductions (Figure 2).

“Insert Figure 2 about here”.

This retailer conducts category planning aggregately, yearly, and separately for each chain because it has six store chains, hundreds of stores, and a broad and heterogeneous assortment sourced from a broad supplier base. Aggregation serves to stabilize supply and demand by specifying suppliers' prices and volumes because of the seasonality of some raw materials, such as agricultural products. Forecasts are the main input, while constraints include access to raw materials, transportation utilization, and warehouse capacity. Challenges exist when several events occur in the same period, and there is a need for extra transport capacity to deliver requested volumes.

Launching new products is the only supplier-driven event. The supplier is the product/brand owner, and new products serve as a mechanism to regulate over- and undersupply of perishable raw materials and products. The frequency is decided by country regulations. The process consists of series of iterations between the suppliers and purchasers. The aim is to better estimate volumes for the new products, ending up with specific orders and changes to store planograms. *Promotions* are the main mechanisms for stimulating demand, and the company continuously runs several promotions. Providing and improving forecasts is the main focus for securing availability. Store pre-orders and their fine-tuning closer to the event is critical for improving forecasts and obtaining supplier commitments. Demand planning for *seasons* is affected by two types of demand: the planning of existing products whose volumes change during the season (e.g. meat during the barbeque season) and planning of specific seasonal products offered only during a season, such as Christmas or other seasonal celebrations. The first is a process similar to promotion planning, while the latter starts well in advance, say six to nine months, to ensure product availability.

Mechanisms for integration: Tactical planning is conducted by three functions with limited cross-functional planning (Table VI). Demand management and event mechanisms drive the planning, followed by operations and supply planning. Meetings with other teams only occur if needed and if there is a conflict of interest. The product and demand complexity is evident (low forecast accuracy) and may explain why the planning is functional. The supply chain cost is not optimized as part of the assortment planning, and logistics operations have to adjust to the assortment plan. Forecasting supply and demand is handled separately in the enterprise resource planning (ERP) system, building on point of sales (POS) and product data from the system. The forecast can be adjusted by individual stores and accessed by the suppliers. The key performance indicators (KPIs) reflect the individual functions, and are primarily used internally in each function.

“Insert Table VI about here”.

Case 2: full range wholesaler

Planning process: The company conducts internal logistics planning based on a forecast with a six-month planning horizon because it is a wholesaler responsible for purchasing and logistics activities (Figure 3). The rest of the tactical planning is initiated by its retail customers who take care of assortment decisions, event planning, and store operations. Case 2 copes with uncertainty in its planning by using POS data and annual supplier agreements. There is a strong focus on securing reliable data by using the IT system for capturing demand data, automating replenishment decisions, and sharing information.

“Insert Figure 3 about here”.

Three types of planning are performed separately with each of the retail chains to ensure high product availability and short supply lead time. For *product introductions*, the company meets with the customers 1-3 times per year to ensure that introductions occur in parallel. The wholesaler investigates the feasibility of the product introductions based on supply possibility, turnover, and costs, all of which form the basis for supplier and customer agreements, such as price and store number. The wholesaler's main challenge is getting good prices because volumes are decreasing, mainly due to an increasing assortment and a large number of stores requesting different products. The *promotion planning process* starts four weeks before the actual event because the customers prefer to deliver this information as late as possible in order to react to competitors' initiatives. The main focus is on establishing a final forecast on a daily SKU level, including the cannibalization effect of the promotion. Within this process, there is a lack of collaboration with logistics, mainly because of the short planning horizon. Thus, purchasing is more reacting and not actually planning. *Seasonal planning* involves seasons of different length and volume and may overlap. Case 2 has identified different "rhythms" for seasonal planning with different products linked to each rhythm.

Mechanisms for integration: Planning is conducted through three individual processes, mainly handled by the purchasing function. Limited executive support and internal collaboration was observed between the purchasing and logistics functions. The number of products and demand features, particularly the company's role as an intermediary, may explain the individual planning process. Because of the intermediate role, the wholesaler shares forecasts with suppliers and customers to stabilize the planning. The KPIs (Table VII) reflect functional rather than collaborative performance evaluation, with the exception of the forecast accuracy review conducted together with the customer to mitigate demand variability. All forecasting activities are handled in an advanced forecasting and replenishment system, which accesses customers' POSs and uses information regarding the effects of previous promotions. This system has been the main arena for planning integration.

"Insert Table VII about here".

Case 3: premium retailer

Planning process: The planning process consists of an integrated process structured in three meetings (Figure 4). This process might reflect a limited complexity, with only a premium-end retail chain, 28 stores, and a main base of local suppliers. In the *event planning meeting* (EPM), the retailer aims to adjust the assortment and to plan promotions. Adjustments are made to reflect trends in sales and consumer satisfaction. In the *promotion planning meeting* (PPM), decisions from the EPM are disaggregated based on availability checks at the suppliers. Case 3 is characterized by a strong desire to promote local products and events, and suppliers are encouraged to provide offers that can support the EPM's outcome while fitting their product availability. This strategy helps to counteract supply uncertainty. Even though the name of the meeting implies promotions, detailed decisions also occur related to assortment and seasonal changes. Finally, the *integration planning meeting* (IPM) is a collaborative meeting with suppliers where previous performance is reviewed, and preparations for upcoming events are made.

"Insert Figure 4 about here".

Mechanisms for integration: Three meetings follow a fixed planning structure aiming to generate a single unified plan with input from all functions, including POS, consumer experience and availability, and special offers (Table VIII). The marketing department drives the tactical planning process, but the retail and purchasing department also is involved. The executive level is part of the consensus process, and physical attendance is compulsory. An explicit activity includes a review of past performance where key measures are used to evaluate performance, particularly focusing on promotion effectiveness, forecast accuracy, shrinkage in product categories, and inventory levels. Forecasting is handled in an advanced forecasting and replenishment system that uses granulated sales information from the stores.

“Insert Table VIII about here”.

Case 4: discount retailer

Tactical planning process: The company plans tactically along two time horizons: yearly planning and 3-6 month planning (Figure 5). The supply chain and the category/purchasing team makes decisions about the category, assortment, and purchasing. Together with suppliers, they establish a yearly agreement for the assortment of promotions acting as input to the aggregated inbound plan. The yearly agreement enables suppliers to plan for the long lead-time of some agricultural products, and is also used to generate planograms and aggregated inbound transportation plans. The retailer operates only one retail chain, which may explain the level of aggregation and team decision-making.

“Insert Figure 5 about here”.

The 3-6 month planning consists of product introductions and a combined process for promotions and seasonal planning. *Product introductions* are driven by the suppliers, and the retailer’s main tasks involve selecting which of the proposed products to include in the assortment and confirming the supplier’s forecast. Previously, suppliers struggled with availability in product introductions, so they formalized the process to be supplier-driven in order to cope with supply uncertainty. *Promotion* and *seasonal* planning occurs once a month for the next 2–3 months, except for long seasons which are planned separately; in addition, the assortment, initial volume estimation, and supplier involvement begins a long time in advance. Stores place pre-orders to get better predictions. Combined with forecasts from the marketing department, suppliers receive volume estimates for confirmation, which is essential to ensure high availability. If suppliers cannot confirm availability, the product is removed from the season/promotion, or substituted.

Mechanisms for integration: The planning aims for cross-functional coordination, especially at the beginning of the process (Table IX). However, the rest of the planning is driven by sales targets, market activities, and product introductions affecting demand uncertainty, which may explain the functional orientation of the planning. The risk is that inter-relationships between products may not be considered. Suppliers and stores primarily are involved in providing pre-orders and confirming availability (except when making yearly supplier agreements). Planning data are processed in different IT systems where the planning component is a spreadsheet-based system. POS data serves as the main planning and forecasting input. The distributed IT platform makes the process time-consuming, comprehensive, and complex. In the yearly planning, a set of measures are applied to review the status including forecast accuracy, fill rate, inventory levels, and costs.

“Insert Table IX about here”.

Cross-case analysis

In this section, we follow the variables of the S&OP process and integration mechanisms (Tables I and II) to identify similarities and differences across cases. We look for explanations for these similarities and differences based on contextual factors in the cases (Table III). At the end, we summarize the main contextual factors and highlight how they affect the need for tactical planning in grocery retailing.

Tactical planning process

First, we study how specific contextual factors affect *process activities* and *set-up*. We observe tactical planning on two levels of aggregation in all cases. In Cases 1, 3, and 4, assortment and promotion planning was conducted on a product family level with a time horizon of up to 12 months. Aggregation reduces complexity and mitigates uncertainty, originating from a large number of heterogeneous products, requirements from multiple retail stores, and demand fluctuations. It further serves to confirm supply volumes and prices from a broad supplier base. An aggregated logistics plan is made in Cases 1 and 4 in order to deal with the large number of stores (1,200 and 600, respectively, compared to the 28 stores in Case 3). In Case 2, this plan makes it possible to respond to capacity variations in a timely manner. The frequency of aggregated planning varies remarkably across cases. It occurs annually in Cases 1 and 4. Interestingly, Case 3 conducts aggregated planning bi-weekly, a procedure that can be explained by the limited customer base, high use of local suppliers, proactive offering of seasonal items, and a narrow assortment compared to the other cases.

For specific demand situations, retailers conduct detailed tactical planning with expert participation. In Cases 1 and 2, there is three separate planning processes for product introductions, promotions, and seasons; while Case 4 conducts promotions and seasonal planning jointly in one process. Only in Case 3, the retailer combines planning of different events. This retailer handles marketing events of different nature and subsequent demand in one joint process; even through the uncertainty connected leads to different activities and timelines for each respective event. In product introduction processes, the process may differ when the initiate comes from the supplier, to enable managing demand for both new products and existing products, whose demand is affected by the new product.

Demand forecasts made from POS data represents the main planning *input* in all cases. Store preorders, as well as suppliers' forecasts for product introductions (Case 1 and 4), are used as additional input information to improve the relatively low level of forecast accuracy. In Case 2, the wholesaler develops the forecasts with the customers. Cases 1 and 4 utilize a yearly supplier contract as input to stabilize supply because the supplier portfolio is broad, and the availability requirements are essential. Important supplier input includes assurances to deliver on promotions (Cases 3 and 4, partially Case 1). Capacity also may be checked at the warehouses, stores, or distribution routes in order to ensure that they do not constrain plans. Other types of downstream input, typical for Case 3, include store feedback and external events, which are probably easier to consider because of the small number of stores and close relationship with the community/suppliers.

Sales plans are the main planning *outcome* in all of the cases; however, there are differences in how and if promotions are planned as well as the coupling of seasonality and product introduction. In Cases 1 and 2, the outcomes are sales plans for individual events; in Case 3, there is a joint plan; and in Case 4, seasonality and promotions are planned jointly. This divergence might result from the unique combination of the number of products and stores, with

Cases 1 and 2 having relatively complex and Cases 3 and 4 having the least complex combination of products and stores. In Case 1, the sales plans for product introductions caused adjustments to store planograms, an adaptation requiring efficient store management because of the assortment size and number of stores. Case 2 does not influence the planograms but uses sales plans for logistical capacity planning. Cases 1 and 4 have inbound plans and allocations across warehouses as an outcome of seasonal and promotional planning processes, a process that might be needed because of the larger number of warehouses and the effect of these events on logistical considerations.

Planning integration

Here we discuss the integration mechanisms across cases. *Meeting practices and collaborative activities* across functions reflect strong integration mechanisms in Cases 3 and 4 seeking to align across different events and sales (Case 3) or to improve the forecast (Case 4). Supplier collaboration serves as the basis for aggregated sales planning (Case 4) and for detailed sales planning (Case 3). Similar to S&OP in manufacturing, there is a team of planners as well as a formal meeting and collaboration structure that includes suppliers in Case 3. This system creates flexibility, allowing the retailer to adjust and respond to external events, such as festivals and other market requirements.

Customer collaboration is essential in the planning processes of Case 2 because the wholesaler does not own the retailers and needs to establish closer collaboration in order to anticipate demand more accurately. Contrary to the call for internal integration as a prerequisite for external integration, the retailers involve suppliers and stores in the planning process to a certain extent. However, they do not necessarily involve them in all internal functions. The purchasing function holds the key coordination role in three of the cases (1, 2, and 4).

We observe that with higher executive involvement (Case 3 and partially in Case 4), the companies tend to have a more formal, cross-functional and integrated *planning organization*. Consequently, in the case of limited executive support, the cross-functional collaboration decreases, and the process becomes more sequential (Cases 1 and 2). Balancing between logistics and demand plans does not happen, and the focus seems to rest on developing sales plans, with the logistics planning responding accordingly.

All cases have defined planning *performance measures*, but only Case 3 establishes measures, such as profit and promotion effectiveness, which drive cross-functional balancing, horizontal collaboration, and improved performance. Case companies 1, 2, and 4 measure functional plan performance. Case 2 reviews the forecast accuracy together with the customers; Cases 3 and 4 involve suppliers in forecasting, and Case 1 receives forecasts from suppliers, which is particularly valuable for product introductions, indicating external integration. Measures like inventory levels, service levels, and picking errors also were reviewed in most cases.

By sharing spreadsheets or information directly, *IT systems* may provide more detailed information, becoming an important integration mechanism in a context with wide product, supplier, and customer bases. Advanced IT systems can support a mature S&OP process, as observed in Case 3. Despite this advantage, IT does not guarantee planning integration, as seen in Cases 1 and 2. Both of these companies have invested in advanced planning software and successfully used it to replenish the stores but still maintained separate planning processes for product introductions, seasons, and promotions. However, IT systems are not key to integrating tactical decisions (as seen in Case 4) even though they could improve efficiency and reduce the complexity of plan integration. All cases emphasize the role of IT for external communication

and information exchange with suppliers and stores, which can partly compensate for the lack of collaborative planning activities, plan integration, and consensus making.

The need for integrated tactical planning in grocery retailing

The grocery retail context compels a need for tactical planning different from manufacturing. Here we summarize the specific product, demand, and supply characteristics while depicting how they affect tactical planning (Table X).

“Insert Table X about here”.

As a general observation, it seems that there exists a limited level of integration in retail tactical planning compared to how manufacturers have adopted S&OP. Functional roles seem to be strong in retailing, indicated also in the measurement system lacking cross-functional elements. One reason may be the strong position of retailers as an important market portal and distribution channel for suppliers, a situation increasing supplier dependence on retailers. In many cases suppliers are brand owners, and are actively affecting demand by promoting or offering new products while also providing demand insight and accurate forecasts. Suppliers traditionally have served retailers well by offering high delivery reliability and short delivery times. The retailers’ position, along with relying on supplier capabilities, has reduced the retailers’ need, interest, and benefit from planning, perhaps explaining the immature level of planning integration in retailing compared to manufacturing.

An interesting finding relates to the tactical planning horizon. The seasonality in both supply and demand determines the time horizon. To manage demand efficiently, the planning horizon needs to reach over the next demand season, for example Christmas or Easter. The start of the process is determined by supply, specifically the suppliers’ capability to deliver the seasonal products, which depends on their packaging material, supply, and production capacity. For promotions, a similar type of planning takes place, but the planning horizon extends to the promotion time. Thus, retailers obey several parallel planning horizons in tactical planning.

Specific mechanisms of tactical planning have responded to the overall complexity of the retailing context. First, the retailers place great emphasis on planning their assortment to ensure availability to consumers. Second, retail store pre-orders are required to manage uncertain demand during market events. Third, a strong focus on sub-planning promotions, product introductions, and seasonal planning, is a way to manage the uncertainty connected to these events.

Proposals for grocery retailing

Retailers are positioned close to the market and are dealing with a large and heterogeneous spectrum of products and customers, making them focus their planning on demand and market events while securing product availability from suppliers. The retail context involves a complex and abundant assortment, supplier, and store base, as well as supply and demand uncertainty; meanwhile, logistics serve as the main resource and constraint. The planning objectives in retail are oriented towards high availability and efficient handling of a broad range of products and high volumes to reach scale benefits (Cachon and Kök, 2007; Fernie *et al.*, 2010; Hübner and Kuhn, 2012). Still, when there are constraints or pressures on the logistical systems — especially when market events overlap — managing supply and demand becomes challenging if decisions are not coordinated. Several impacts are evident, such as high inventory levels, waste costs, and transportation expenses, all of which could be managed following a balanced planning approach. Consequently, for grocery retailers, the S&OP process should be understood as an aligned and

coordinated decision-making process for reaching the unified targets of planning (Tuomikangas and Kaipia, 2014).

Tactical planning process alignment

It would be particularly beneficial for retailers to adopt, first, a practice aiming at balancing supply capabilities with demand requirements, and second, the formal nature of S&OP. In doing so, retailers could advance internal and external integration while aligning tactical planning with strategic and operational planning. This would reduce supply and demand uncertainty, improve availability, lower inventory levels and reduce waste, and optimize the use of the logistics system. As a result, we make the following argument:

Proposition 1: Because the specific context of supply and demand management in grocery retailing is characterized by seasonality, intense promotions, and frequent product introductions, tactical planning would benefit from adopting a formal process, integrating internal functions and events into a single plan.

Reaching consensus on supply and demand targets requires strong management involvement, support, and a structured S&OP process (Vieira *et al.*, 2009; Tuomikangas and Kaipia, 2014; Goh and Eldridge, 2015). By exploiting the insights gleaned from tactical planning in our cases, we propose a structure for the S&OP process in grocery retailing in Figure 6.

“Insert Figure 6 about here”.

Step 0 is a review of event plans where aggregated market decisions regarding sales, promotions, and similar demand-stimulated events are revised considering the suppliers' status, including over- and under-supply (Yurt *et al.*, 2010). In all cases, we observed that this initial input takes place at the very beginning of the process and is essential for grocery retailing. *Step 1* includes three parallel processes for gathering data to establish initial unconstrained plans for three demand-stimulating activities. The three plans later are combined in *Step 2* where a joint unconstrained demand plan is formed. *Step 3* deals with the generation of a supply plan while considering the suppliers' capacity, the inbound/outbound transportation, and the warehouse. During *Step 4*, the supply and demand plans are balanced considering cost-effective trade-offs, and contingency plans are established. If no conflicts appear, the plans are approved, and a review of performance occurs. If there is a disagreement or need for radical decisions, an executive meeting should take place in *Step 5*.

Based on these cases, we envision that the setup of the S&OP process should have a time horizon of approximately 6-12 months, affected by the start of planning of the next sales season and the planning of new product introduction. It is important to acknowledge that the planning horizon can vary, and it should fit the individual retailer's environment. Even though the demand-oriented context in the cases demonstrates a need for lower-level and short-term tactical planning, we argue that the long-term S&OP horizon (1-2 years), aggregated planning, and executive support applied in manufacturing (Grimson and Pyke, 2007) is also important in grocery retail planning. This finding is particularly relevant because of the long total lead time for grocery products and supplier contracts. This kind of planning also is necessary for timely responses and strategic direction (e.g. new stores and novel concepts). This concept might represent a radical change in retail planning practices, which currently involve deciding on assortment once to twice a year (Agrawal and Smith, 2009). The planning frequency is monthly, but should be adjusted if opportunities or risks arise from the supply side (availability problems) or from the demand side (competitors' actions or new stores). Due to the strong focus on demand-

stimulating activities, S&OP can be conducted on a SKU-level for the shorter time horizon, as reflected in all of the cases and in the norms of the grocery retail industry (Holmström *et al.*, 2002; Ivert *et al.*, 2015). However, some decisions, such as promotions, might occur at a more gross level as the horizon extends more than three months out.

Increasing tactical planning integration

The S&OP literature suggests that strategic alignment, top management ownership, cross-functional planning, and shared planning objectives (Thomé *et al.*, 2012; Wang *et al.*, 2012; Tuomikangas and Kaipia, 2014) are necessary for S&OP to succeed (Grimson and Pyke, 2007; Tuomikangas and Kaipia, 2014). These factors may have a positive impact on planning performance (Thomé *et al.*, 2014; Goh and Eldridge, 2015; Kristensen and Jonsson, 2018) by making planning efficient, coordinated, and harmonious (Agrawal and Smith, 2009; Oliva and Watson, 2011; Aftan *et al.*, 2015).

In this study, the grocery retailers applied functional and sequential planning with limited coordination and a lack of shared planning objectives. Tactical planning seems to be overlooked in terms of strategic importance. Executive leadership and participation were limited. Due to the planning complexity regarding products, suppliers, and stores, planning is broken down to a lower level and becomes closer to operational planning executed by middle management. On the other hand, retail's demand orientation creates a marketing and sales-driven planning that hinders collaborative planning. Consequently, we make the following proposition:

Proposition 2: There should be explicit support and ownership from top management, expressing shared objectives for planning, consensus, and empowerment in order to foster collaborative planning; this strategy is particularly important because of the dominant demand-oriented culture and complexity of the grocery retailing context, characterized by large product, supplier, and customer bases.

This study shows that even at a low level of functional integration, suppliers and stores are involved in planning to some extent. Furthermore, this finding shows that the retailers place conscious effort into involving external parties, but hold a dimmer awareness of internal integration. We find internal integration equally important to external integration in retailing, and it appears that the current organizational structure does encourage or place responsibility or authority on ensuring cross-functional planning. Therefore, we make this suggestion:

Proposition 3: Grocery retailers with a broad and heterogeneous assortment, multiple retail stores from different retail chains, and a large supplier base would benefit from an organizational structure with dedicated responsibility for coordinating and integrating functional decisions from category and assortment management, demand planning, purchasing, and logistics, thus reaching a single consensus-based tactical supply and demand plan.

External and internal collaboration can intensify each other (Stank *et al.*, 2001; Sadler and Hines, 2002), and supplier integration should be pursued simultaneously with the deployment of internal S&OP practices (Thomé *et al.*, 2014). The S&OP literature suggests that suppliers and customers should be included in the planning process (Affonso *et al.*, 2008; Wang *et al.*, 2012). In our cases, suppliers were involved in the planning either by taking part in discussions about market targets and forecasts or by sharing information about new product development. Involving suppliers was a means for the retailers to stabilize supply in terms of availability, especially for

new products. Stores, in general, seem to be less actively involved in the planning except for placing pre-orders and giving feedback on market surveys. Therefore, we make this proposition:

Proposition 4: Grocery retailers would benefit from a supply-chain wide planning approach that actively seeks to involve suppliers and customers into their tactical planning process in order to adequately understand and create demand while ensuring product availability.

The literature has argued that technological advancement in information sharing has brought about improved integration of plans, particularly in terms of increased levels of consolidation, sharing, and ownership of information. As an integration mechanism, IT has become more important when moving towards a more mature S&OP process (Ivert and Jonsson, 2010; Oliva and Watson, 2011). In the retailer context, it seems that this mechanism is not necessarily related to the maturity of the planning process integration. Advanced planning tools were observed in cases with lower planning integration (i.e. maturity), indicating that the role of the IT system is mainly to increase and manage the speed and complexity of the planning. On the other hand, higher planning integration was observed in a case with less integrated IT systems. Thus, we propose the following:

Proposition 5: In a grocery retail context, advanced IT solutions improve the efficiency and communication of the tactical planning process, but these solutions need to be supported by other mechanisms (organization, collaboration, and performance measures) to ensure integration.

We also expect integration to increase through the use of relevant performance measures (Grimson and Pyke, 2007; Thomé *et al.*, 2012). All cases showed a strong focus on evaluating the forecast accuracy, which indeed can be considered an important measure for the S&OP process (Thomé *et al.*, 2012). Nonetheless, the parallel use of this measure and other functionally-oriented measures fails to stimulate integration across functions and different sub-plans in retailing. Performance evaluation through cross-functional measures, such as shrinkage, promotion effectiveness, seasons, and new product launching, appears to be lacking in the cases. In the S&OP process, reviewing cross-functional measures should be an essential part of the data gathering and pre-meeting steps (Figure 6). Harwell (2006) suggested evaluating performance through gross profits compared to display space in the store. Improved performance would require excellent assortment and pricing decisions as well as a sound balance of supply and demand. More generally, we propose the following:

Proposition 6: With a broad assortment facing supply and demand uncertainty, tactical planning in retailing would benefit from a cross-functional and process-level planning performance evaluation to ensure targeting the same goals.

Conclusion

This study's main contribution is its proposal that retailers would benefit from a formal and company-wide S&OP process to better unify different market-oriented plans. This unification could balance supply and demand without sacrificing the emphasis on demand planning and managing marketing events important in the retailing business. Furthermore, the study suggests improved integration by top management ownership, shared planning objectives, and reward mechanisms. The organizational structure should foster responsibility for integrating functional plans and for involving suppliers and customers in the planning. Integrated IT solutions may

increase planning efficiency, but they do not ensure planning integration. Meanwhile, evaluating the performance of demand management activities would gradually improve knowledge about the impact of market events in enhancing tactical planning. This research elaborates on the existing retail planning literature (Hübner *et al.*, 2013; Kuhn and Sternbeck, 2013) and enriches the S&OP literature with a retail-specific study (Kristiansen and Jonsson, 2018; Thomé *et al.*, 2014; Oliva and Watson, 2011). Managerially, the study provides a proposal for designing the S&OP process in retailing, extending the work of Yurt *et al.* (2010).

Although the research benefits from rich and exploratory data from the grocery retail sector in Finland, Norway, and the UK, it has limitations that require further research. First, the study is limited to four cases, at various maturity levels in terms of S&OP implementation. We found initial results about varying planning horizons as well as about the level of aggregation. For future research, we suggest exploring the different S&OP implementations based on a wider data collection in the retail context. We observed low participation and limited ownership of executive management in tactical planning; however, we were unable to conduct a detailed study into how this participation could supplement planning integration, a question that will be important in future research. IT and information sharing are important in retail because of the planning complexity involved, and further research should look deeper into decision complexity and the use of advanced decision support systems to improve information usage, decision making, and analytics. Future studies could verify our process and propositions, particularly because retailers were the sole providers of data, omitting information from suppliers and customers. Deeper insight is needed regarding the integration of supply chain partners in planning, particularly in exploring how suppliers and customers could enrich the planning process and its integration. We studied four cases from three different countries in grocery retailing. Comparisons of different retail industries with larger data sets would be valuable in helping to understand the planning environment and the contextual characteristics of retailing.

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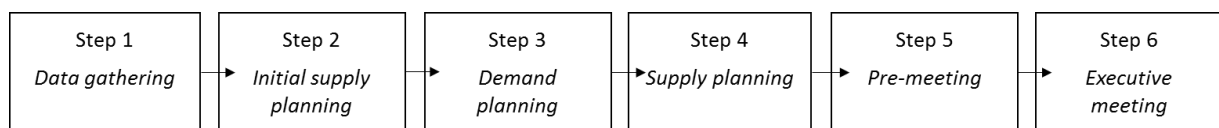


Figure 1: S&OP process activities for a case of highly variable supply (adapted from Yurt *et al.*, 2010)

Table I.
S&OP process variables

Process variables	Indicators
Activities	Data gathering, demand planning, supply planning, planning consensus, and planning approval
Setup	Planning horizon, planning frequency, and planning object
Input	Plans, forecasts, constraints, and information on customers, suppliers, resources, capacities, and inventories
Outcome	Level of incorporation of sales information into supply planning and vice versa The direction of the planning process: one-way/sequential or two-way/concurrent. Forecast and plans developed from either top-down (driven by business and financial goals) or bottom-up approach (driven by operational considerations and sales forecasts).

Table II.
S&OP mechanisms enhancing plan integration

Mechanisms	Indicators
Meetings and collaboration	Level of involvement in cross-functional/cross-company planning meetings Span of collaboration in development and use of input data and separate plans Formalization and regularity of meetings, communication between meeting rounds Level of data access Alignment of goals
Organization	Formalization of S&OP functions and team Level of empowerment and executive participation
Performance measurements	Span of measurements across functions Cross-functional accountability for different targets Measurements of S&OP effectiveness

Information technology	Level of ownership of information and its updating Level of sharing and consolidation of information Level of advancement in technology for decision making
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Table III.
Grocery retailing characteristics

Product	Large number of products Interrelationships in demand among products Shortening product life cycles, more frequent new product introductions Short shelf life of product Heterogeneity
Demand	Multiple retail chains Seasonality of demand Stimulating events such as promotions High availability requirements
Supply	Seasonality of supply Broad supply base Multiple brands for the same type of product Capacity constraints Long supply lead times

Table IV.
Case features reflecting the grocery retailing characteristics

Features	Cases			
	Case 1: full range retailer	Case 2: full range wholesaler	Case 3: premium retailer	Case 4: discount retailer
Company <i>Nature of the company</i>	Full range grocery retailer	Grocery wholesaler serving independent retail chains and cash-and-carries	Grocery retailer, premium stores and products	Grocery retailer serving discount stores
<i>No of employees</i>	22,500	570	3,000	20,000
Product <i>Types</i>	Dry, frozen, chilled, bread and fruit/vegetables	All types of grocery products, except frozen products	Premium products, mostly fresh food and beverages	Dry, frozen, chilled, bread and fruit/vegetables
<i>No of products</i>	8,500	16,000	13,000–14,000	5,000
Demand (customer base)				
<i>No of retail chains</i>	6	4	1	1
<i>No of stores</i>	1,200	6,000	29	600
Supply <i>Supplier base</i>	A large group of different suppliers	A large group of different suppliers	A medium base of suppliers. Local suppliers favored, typically small suppliers of seasonal products.	A medium number of suppliers

Table V.**Depth of involvement with the companies**

	Case 1: full range retailer	Case 2: full range wholesaler	Case 3: premium retailer	Case 4: discount retailer
Period	Jan. 2015–2016	Jun 2016	Jan 2016 and Jul 2016	Aug 2016
Data sources	6 interviews (1.5-2 hours). Memos from meetings. 4 workshops (2-3 hours). Process mapping. Statistics and reports from business information systems. Annual reports	3 interviews (1-2 hours). 3 workshops (2-3 hours). Planning process descriptions. Company presentation slides. Annual report 2015. Company web pages	1 workshop (3 hours). 2 interviews (1.5 hours). Presentations. Company web pages	1 interview (2.5 hours). 1 workshop (3 hours). Annual report. Web pages
Role of the interviewees	Chain manager. Procurement manager. Logistics development director. Senior project manager. Logistics planner.	Planning manager. Sourcing manager. Supply chain analyst.	Supply chain manager. Supply chain analyst.	Distribution manager.

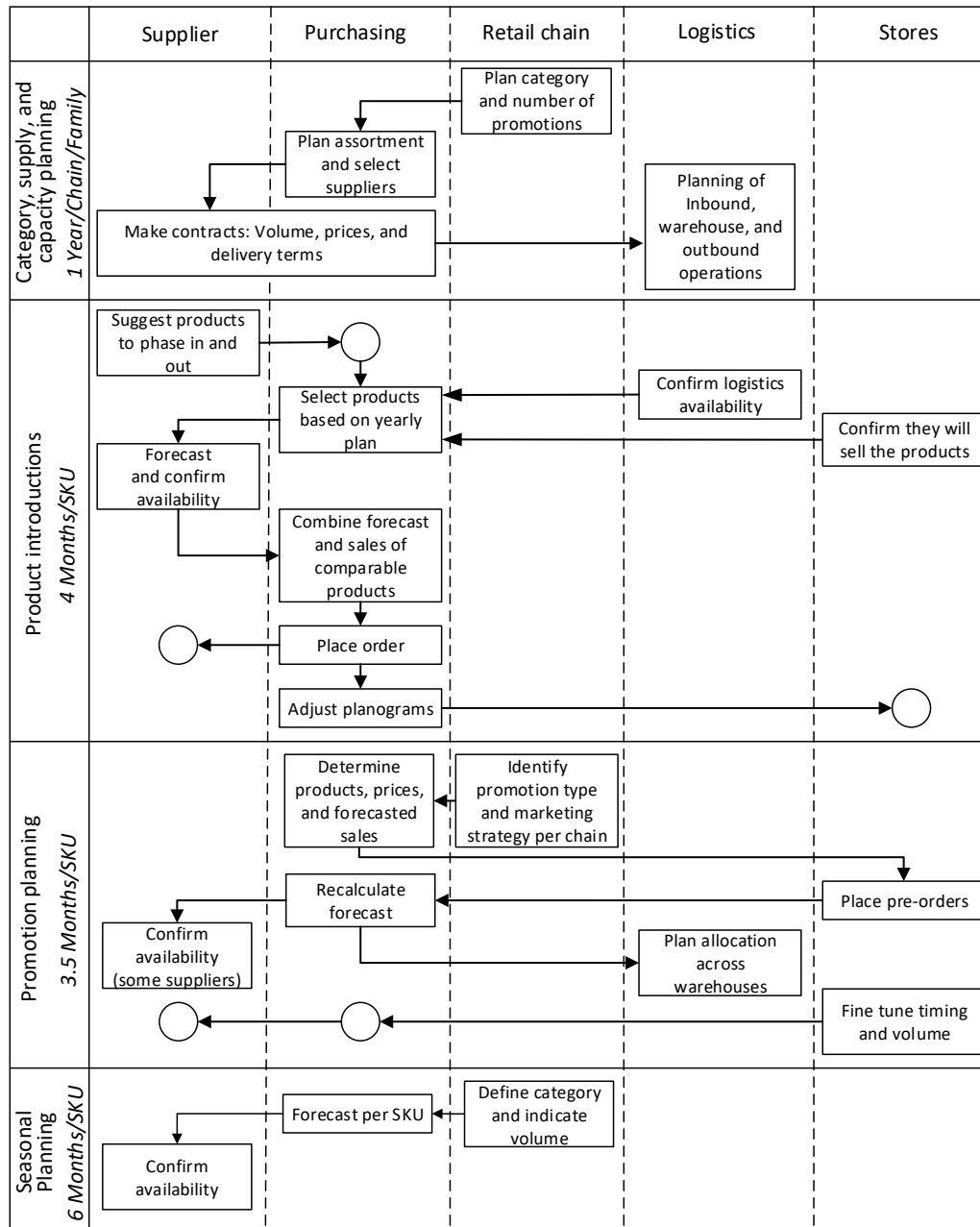


Figure 2: The tactical planning process in Case 1.

Table VI.
Integration mechanisms in Case 1

Mechanism	Observations
Meetings and collaboration	Functional planning with limited cross-functional collaboration. Some formalization of the process. Some involvement with suppliers and customers.
Organization	No fixed practical planning team and no executive support.
Performance measurements	Functional measures, such as stock level, service level (to and from the warehouse), and waste level (at the warehouse and the stores).
Information technology	All information is collected and shared in a common ERP system

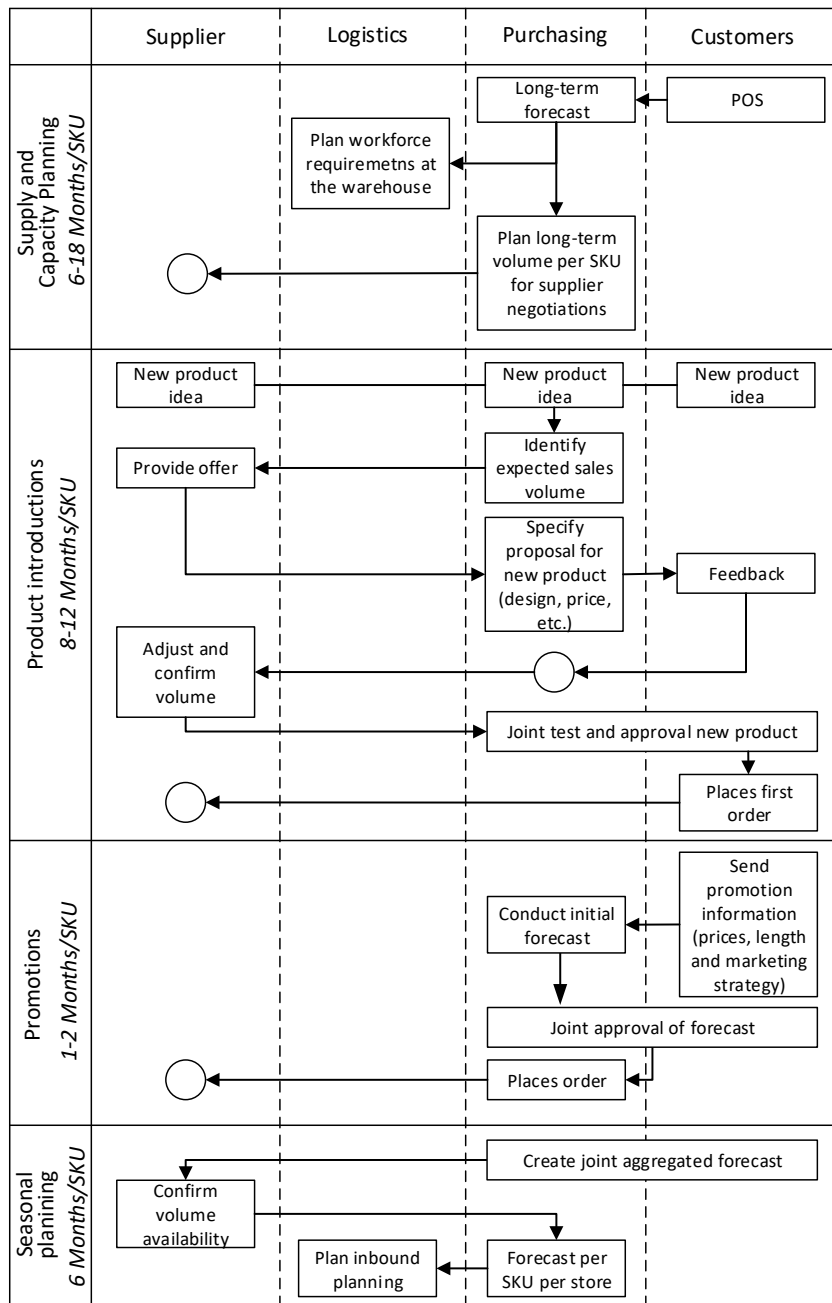


Figure 3: The tactical planning process in Case 2.

Table VII.
Integration mechanisms in Case 2

Mechanism	Observations
Meetings and collaboration	Separate planning processes, but with a rather formalized sequence and agenda. Involvement of suppliers and customers when needed.
Organization	All tactical planning is handled mainly by Purchasing. Limited executive support.
Performance measurement	Forecast accuracy for warehouse and stores, fill rate, and picking errors at the warehouse.
Information technology	Use of advanced forecasting and replenishment tool integrates internal functional planning.

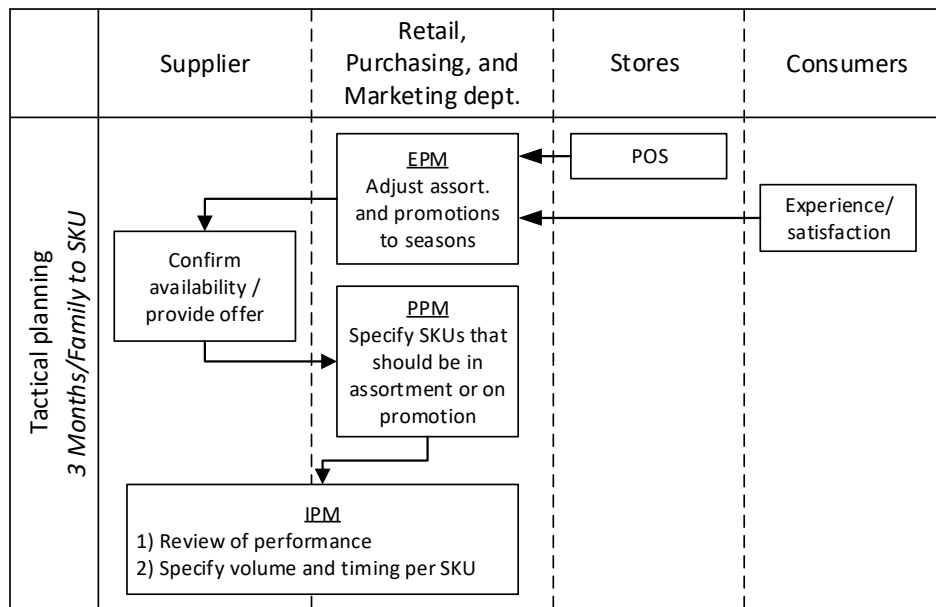


Figure 4: The tactical planning process in Case 3.

Table VIII.

Integration mechanisms in Case 3

Mechanism	Observations
Meetings and collaboration	Highly formalized set of meetings between all functions with fixed agenda and frequency. Involvement of suppliers and customers.
Organization	Clear cross-functional team handles the tactical planning process with executive support.
Performance measurements	Use of rather wide KPIs, such as promotion effectiveness and product shrinkage.
Information technology	Use of advanced forecasting and replenishment tool.

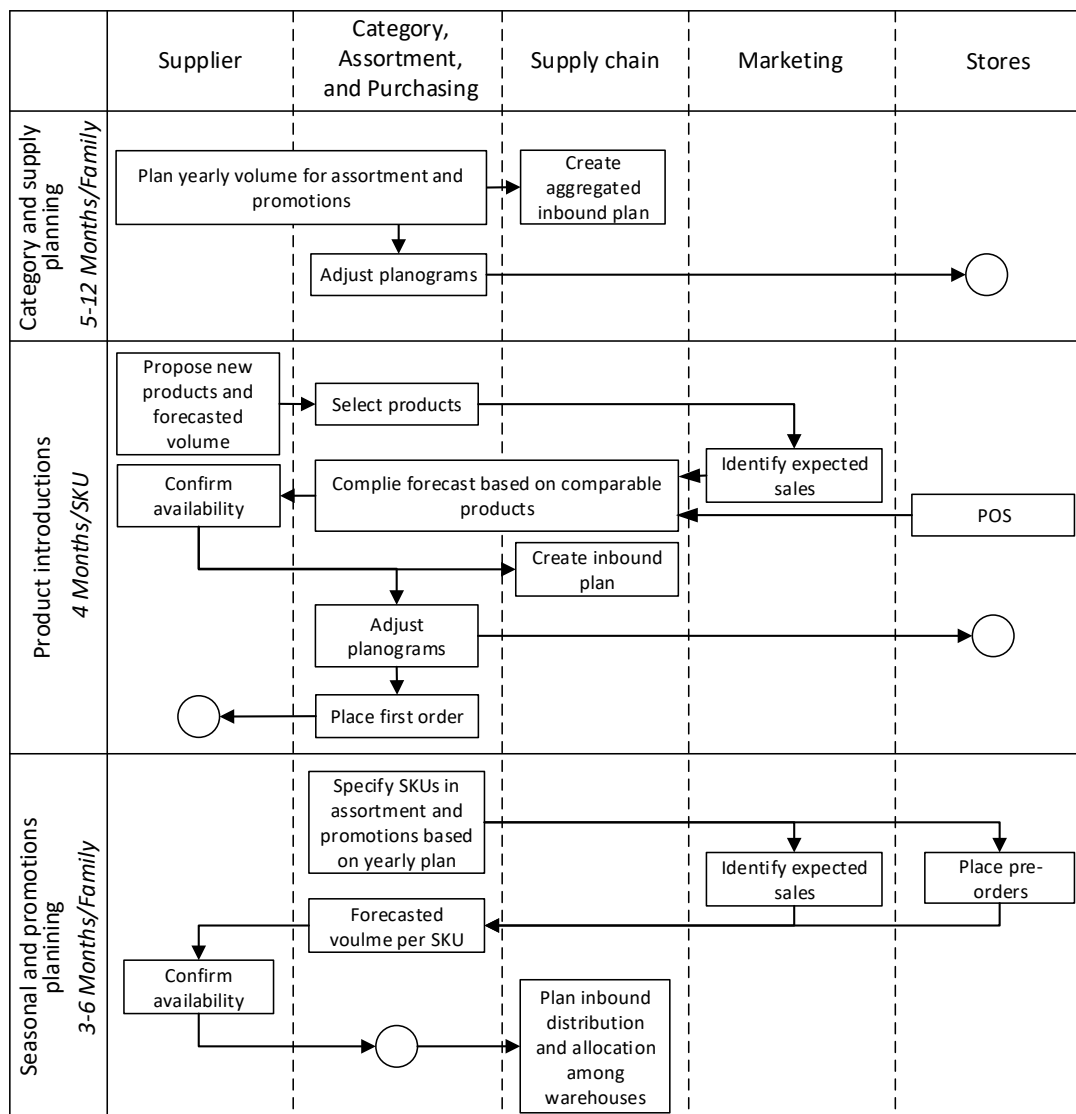


Figure 5: The tactical planning process in Case 4.

Table IX.

Integration mechanisms in Case 4

Mechanism	Observations
Meetings and collaboration	Cross-functional involvement. Involvement of suppliers and customers. Separation between centralized and decentralized planning.
Organization	Executive support in the yearly planning and a rather well-defined tactical planning team.
Performance measurements	A wide set of functional measures applied. No cross-functional measures.
Information technology	Data from six different IT systems are collected into one single spreadsheet.

Table X.

Influence of grocery retailing context on tactical planning

Grocery retailing characteristics	The impact on tactical planning	Examples
Product <i>Large number of products</i>	Category and assortment planning	Yearly aggregated planning (Cases 1, 3, and 4, in Case 2 conducted by customers), per

<i>Short product lifecycle</i> <i>Heterogeneity</i>		chain, per product family. 3-18 months horizon, SKU level to mitigate uncertainty (all cases).
Demand <i>Customer base; multiple retail chains with many retail stores</i> <i>Uncertainty</i> <i>Promotions, new product introductions, and demand seasons</i>	Planning of stimulated demand activities; inbound/outbound planning	Tactical planning process(es) with a horizon of 2-8 months to manage demand (all cases). Grocery retailers with more retail chains, stores, and products handle stimulated demand activities separated to reduce complexity (Cases 1 and 2), while smaller grocery retailers (Case 3 and partially 4) integrate decisions into one process.
Supply <i>Seasonality</i> <i>Broad supplier base</i> <i>Long lead times</i>	Supply and assortment planning; planning of stimulated demand activities	Yearly agreements with suppliers to reduce uncertainty (Cases 1, 2, and 3), confirming availability at suppliers, particularly important for the seasonal planning due to long lead-times; collaboratively introducing products with suppliers (all Cases); involving suppliers in promotion planning (Case 3).

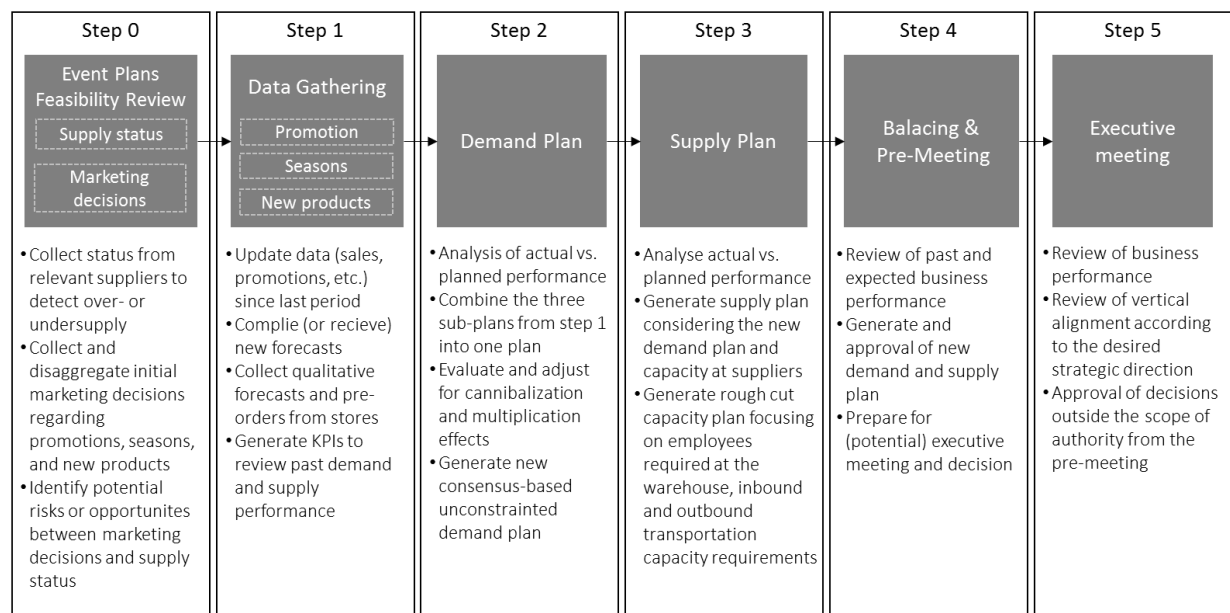


Figure 6: Proposed S&OP process for retailing (modified from Yurt *et al.*, 2010 and Wagner *et al.*, 2014)